

Radiation-Tolerant, Space Wire-Compatible Switching Fabric, Phase II

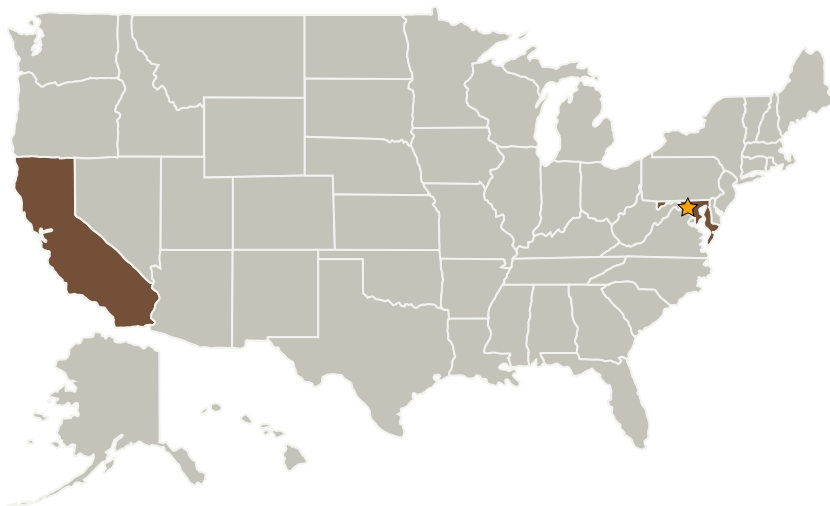
Completed Technology Project (2007 - 2009)



Project Introduction

Current and future programs of near-Earth and deep space exploration require the development of faster and more reliable electronics with open system architectures that are reconfigurable, fault-tolerant, and can operate effectively for long periods of time in harsh environments. Existing data transfer systems based on passive backplanes are slow, power hungry, hardly reconfigurable, and feature high latency, limited expandability, and low radiation tolerance. During Phase I, our company has proven in computer simulations the basic concept of a radiation tolerant switching fabric backplane with reconfigurable serial interfaces. During Phase II, the company proposes to develop a functional prototype of a novel, radiation-tolerant, switching fabric with user-programmable interfaces that support either Space Wire or the company's proprietary multi-level interconnect solution. The patent-pending multi-level interconnect technique provides improved serial point-to-point link functionality including lower latency, higher speed and lower power consumption. It eliminates the requirement of the second information channel utilized in Space Wire's data-strobe encoding scheme, which can be instead used as a redundant channel to improve the system's fault tolerance. The unprecedented reliability of the developed system-on-chip is guaranteed by utilization of inherently radiation-tolerant SiGe hetero-junction bipolar transistors in proprietary circuit structures that are specifically hardened to single-event effects.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Advanced Science and Novel Technology	Supporting Organization	Industry	Rancho Palos Verdes, California

Primary U.S. Work Locations

California	Maryland
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
 - └ TX02.2 Avionics Systems and Subsystems
 - └ TX02.2.5 High Speed Onboard Interconnects and Networks